U.S. EXPORT COMPETITIVENESS IN THE INFORMATION AGE: THE ROLE OF GOVERNMENT

Y 4. IN 8/16: EX 7/9

U.S. Export Competitiveness in the...

HEARING

BEFORE THE

SUBCOMMITTEE ON INTERNATIONAL ECONOMIC POLICY AND TRADE

OF THE

COMMITTEE ON INTERNATIONAL RELATIONS HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

FIRST SESSION

JUNE 13, 1995

Printed for the use of the Committee on International Relations

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U.S. EXPORT COMPETITIVENESS IN THE INFORMATION AGE: THE ROLE OF GOVERNMENT

TUESDAY, JUNE 13, 1995

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERNATIONAL RELATIONS,
SUBCOMMITTEE ON INTERNATIONAL
ECONOMIC POLICY AND TRADE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:30 a.m. in room 2172, Rayburn House Office Building, Hon. Toby Roth (chairman of the subcommittee) presiding.

Mr. ROTH. Good morning.

This will prove to be an interesting morning. From now on, I think all members should have a computer at their table.

Mr. Chairman, and Chairman Gilman, it is a delight for us to have you here this morning at such an important hearing on the future of not only technology and business, but also of Congress.

So, Mr. Chairman, thank you for attending this morning.

Mr. GILMAN. Well, Mr. Chairman, I want to congratulate you, Chairman Roth, for conducting this hearing. The Subcommittee on International Economic Policy and Trade certainly is examining an important aspect of international trade when you get into our competitiveness and the information age and the role of government. I am pleased we are able to have Michael Armstrong, Chairman and Chief Executive Officer of Hughes Electronics with us, and John Gage, Chief Science Officer, Sun Microsystems. I look forward to this hearing.

Thank you, Mr. Chairman.

Mr. ROTH. Chairman Gilman, John Gage, Chief Science Officer of Sun Microsystems, has been here since yesterday setting up for this hearing today. So we want to thank John and his staff for their dedication.

Mr. GILMAN. I hope someone will tell us how to use all of this great equipment.

Mr. ROTH. Well, they are going to have us linked up with Moscow and Beijing, and all over the world, and it is exciting.

Michael Armstrong, it is good to have you here again with us.

Mr. ARMSTRONG. Thank you, Mr. Chairman.

Mr. ROTH. I have met with Chairman Michael Armstrong a number of times and have always been most impressed.

Twenty years into the next century, people will look back at 1995 as the year when computers and telecommunications really started to come together.

The truth is that we are witnessing a revolution every bit as profound as the harnessing of electricity, the invention of the electric light bulb and the onset of the nuclear age.

As our witnesses will demonstrate, communications technology has suddenly leaped forward, giving every person the ability to communicate with every other person around the globe, instantaneously, without telephones and wires, regardless of national borders, and most important, beyond the control of any government.

Governments can't control the spread of this revolution, but they can help, or hinder, the companies that are competing for the tens of billions of dollars in new business that are generated by this revolution and, I might say, good-paying jobs and a future for our youngsters.

Our national economic security depends on maintaining our lead in computers and communications, and that lead depends on our ability to sell our technology and services everywhere around the globe.

My concern is that out-of-date U.S. policies are hurting American companies, losing jobs for American workers and retarding our technological lead.

The bottom line is that our outmoded government policies, such as export controls, unilateral trade sanctions, and regulation of communications are hurting our country.

To explore these issues, we have two of America's foremost technology leaders: Michael Armstrong, Chief Executive Officer of Hughes Electronics Corporation and John Gage, Chief Science Officer of Sun Microsystems, Incorporated.

They will take us on a tour of the new world of information technology and show us just how badly our government has fallen behind in this vitally important field of the future.

This subcommittee is taking the lead in helping Mike Armstrong, John Gage and other leaders of America's cutting-edge companies. Our goal is to break down the barriers within our own government, so that our competitive position in high technology is not a casualty of friendly fire from the U.S. Government.

Gentlemen, what we need from you is your best advice on how we can help make our U.S. companies compete and how we can help them win.

We will begin with Mr. Armstrong.

STATEMENT OF C. MICHAEL ARMSTRONG, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, HUGHES ELECTRONICS CORP.

Mr. ARMSTRONG. Thank you, Mr. Chairman, members of the committee.

As you know, it is my distinct honor to serve as the Chair of the PEC, President's Export Council, but today, I appear as Chairman and CEO of Hughes Electronics. As such, I speak for myself and my company only. But the issues under your purview are critical not simply to my company, but to so many of America's cutting-edge industries, and indeed, to the competitiveness of the U.S. economy as a whole.

I would like to begin today with what I believe is a fundamental factor in our quest for exports in this information age; that is the speed of technology in bringing new products, new markets, new lifestyles, and new economics to our society.

In contrast to the days when either government or megacorporations defined markets, today the contest pits the speed of technology versus the speed of bureaucracy, or more precisely, the lack of it, as the information age makes a mockery of borders and barriers of all kinds. While the government is busy managing technology exports, the 1995 Cadillac now has roughly the computing power under its hood as the original guidance systems that landed the Apollo space capsule on the moon.

And just to bring that home, I brought a toy, which is the engine control module for the power train of the 1995 Cadillac—I hold it in my hand—which has more computing capacity than that original Apollo space shuttle.

We seem to think that technology can be quarantined by bureaucracy. The fact is that technology travels. One nation's export ban is another nation's economic boon, an invitation to win trade opportunities while competitor companies are kept in the penalty box. On this last point, let me offer another exhibit, which is an outdated cold war relic we call a Munitions List, that too often teaches the right lesson to the wrong people.

In April, it was a businessman stopped at customs for attempting to carry a telephone security scrambler. That is a technology on the Munitions List. That made that device a dangerous weapon, right along with ballistic missiles and nuclear warheads.

Meanwhile, any foreign national can walk into an American computer store, buy the same encryption software that makes the phone secure, and take it out of the country. Even that is a waste of a plane ticket, because anyone on the Internet can e-mail that program anywhere in the world. In fact, there is only one way that you can't sell that software abroad, and that is if you are an American citizen. And what is true for the telephone device is true for satellite transponders as well.

What we can't sell abroad, foreign nationals can freely buy in markets around the world. We see it in industries from automobiles and aircraft engines to pharmaceuticals and computer chips. Commodity jurisdiction snafus don't just defy common sense, they cost the U.S. jobs and gross domestic product.

To protect our national economic interests as well as our national security, we must bring the munitions list out of the cold war. We must have pro-export U.S. policies that enable an internationally competitive America, and this includes a revamped and export-driven Export Administration Act.

If the information age makes a mockery of borders and barriers and bureaucracy, it seems to me that we should answer the question: What must government do to enable America to be an export superpower? I would offer four suggestions for your consideration:

First, government must act to open markets for our exports and our investment. The passage of NAFTA and GATT will serve trade expansion well, and the passage of these landmark agreements was surely a signal from both ends of Pennsylvania Avenue that America's destiny was tied to trade.

However, we need to build on those successes and open the market of the second largest commercial nation in the world. We should support the difficult negotiations now under way with Japan. It will never be easy there; it will take understanding and trust on both sides, but we must begin now.

We need to sustain our support for Mexico, our third largest export market. It is not politics; it is not Federal aid; it is not a giveaway to the banking interests; it is simply in our economic self-interest.

We need to ensure market access for U.S. consumer goods, taking aim at restrictive standards designed to keep our products out and protect domestic producers.

We need effective, strategic negotiating authority in government to respond, act and to conclude. Fast-track negotiating authority is not an option, it is a necessity, if we really want to open markets.

And while we drive to open markets, we should concurrently demand that respect for intellectual property rights must be a condition of access to our market.

Second, in addition to opening markets, all of our government must act as export advocates. While the Department of Commerce has a sensible and thoughtful national export strategy, we need support and follow-through in the marketplace.

The Departments of Commerce, Defense, Transportation, Energy and Ambassadors around the world are now not only stating their support, but engaging to help make things happen. But we need even stronger advocacy and leadership in international markets, not just on domestic podiums.

I have heard proposals to reorganize the U.S. Foreign and Commercial Service, a network of offices across the country and in our embassies. The Commercial Service's clientele are American companies trying to break export barriers and win business. This is an area where our present organization and effectiveness is making sense, I believe change would be a mistake. It really ain't broke, so don't fix this one.

And I have also heard there is a proposal to turn export licensing over to the State Department. Let me state unequivocally that export policy should absolutely not be tied to foreign policy. As Clyde Prestowitz said recently: "If you really want to kill exports, put export licensing in the State Department."

Third, at times government must act as an export financier. This is not a disguised form of foreign aid. There are many instances where businesses and banks with their balance sheets should fear to tread; where the risk, the venture, or the competition dictates that the appropriate role of government is as guarantor.

Exim and OPIC are market necessities for small and large business alike to compete abroad and to create jobs at home.

And fourth, I firmly believe we must reconsider the use of unilateral economic sanctions. Generally speaking, history has judged unilateral economic sanctions as an unsuccessful policy to change errant behavior. Please permit me to cite a recent example.

In August of 1993, the State Department invoked unilateral economic sanctions against China for violation of the MTCR, Missile Technology Control Regime. This was due to alleged shipments in 1992, the year before, of M–11 missile parts to Pakistan. The State

Department chose to extend interpretation of the munitions list to embedded technology. Based on this interpretation, it then prohibited the export or launch of commercial communications satellites from China.

As a result, Australia and Hong Kong could not launch their Hughes-built satellites, satellites that would primarily be carrying home television, much of it American programming. In addition, China immediately canceled orders with Hughes for two other satellites, mainly to be used for tying their banking system to it. This was a $400 million order worth hundreds of American jobs.

Then, after Chancellor Kohl of Germany visited China in this same timeframe and pointed out the differences between American and German trade policy, China canceled a joint agreement with Hughes to build another 10 satellites, and transferred this multibillion dollar agreement to Deutsche Aerospace. Thousands more jobs were lost.

To my knowledge, these sanctions did not economically hurt China, but they certainly registered in California, affecting employment for people already dealing with difficult times.

We need to recognize the economic reality that the United States is no longer sole supplier of the world's state-of-the-art technology. It is a tough market out there, and for other countries, U.S. unilateral economic sanctions are often a significant competitive advantage for them. If we are going to impose economic sanctions, they should penalize the errant country and be coordinated with our allies to join us.

In today's global market, sanctions must be multilateral to work. Anything less is simply a shift in the flow of commerce, a few thousand fewer jobs in America, and no change in behavior. The purpose of sanctions must be to change errant behavior, not to downsize American business and jobs.

To help realize this purpose, I would like to restate a recommendation I recently made personally to Secretary of State Christopher; there needs to be a new process, a process with input from affected industry before sanctions are announced. With such a process, it is possible sanctions could be implemented without sustaining such serious self-inflicted wounds.

In my opinion, unless and until such a process is adopted, American companies, workers, and our competitiveness will be unnecessary casualties of a government more sensitive to politics than to its people.

Mr. Chairman, committee members, fundamentally we need the right functions of government doing the right things for our global competitiveness. Anything less, and our exports will decline and our economy will suffer.

But with the right kind of support, we will realize America's economic destiny as an export superpower, which will mean more well-paid jobs for Americans and a sustainable high standard of living for America.

Thank you for very much for giving me this opportunity to share my thoughts, and I would be happy to answer any questions.

[The statement of Mr. Armstrong appears in the appendix.]

Mr. ROTH. Well, thank you very much, Chairman Armstrong.

I am delighted to introduce some of our colleagues this morning. You have met Chairman Gilman. We have also been joined this morning by Congressman Rohrabacher from California, Congresswoman Meyers, Congressman Chabot, Congressman Ballenger, and Congressman Moran.

I think we will ask Chairman Gilman if he has any questions for our guest here this morning.

Mr. GILMAN. Thank you, Mr. Chairman.

Mr. Armstrong, we thank you for your comments. What is your view of the idea of eliminating our Commerce Department which is now before the Congress?

Mr. ARMSTRONG. I think I am an expert in eliminating, downsizing and restructuring, Mr. Chairman. Our company has gone from some 82,000 employees in aerospace and defense to about 38,000 employees.

Mr. GILMAN. That is quite a cutback.

Mr. ARMSTRONG. And I think there is one thing I have learned and that is you cannot downsize and restructure your way to growth. While you cannot grow without being competitive, it takes investment and advocacy and financing and a reasonable commodity jurisdiction in order to promote exports internationally today. Those functions of government should not be downsized, restructured and eliminated. It would be the equivalent of economic disarmament internationally.

The Commerce Department, with the International Trade Administration, and its Commercial Services departments across the globe are performing those functions very well. My appeal today is that they need even more support. OPIC and Exim need more support, that the functions of government need to be stronger advocates and stand behind small and large business alike.

So the elimination of the Commerce Department, I would challenge, is foolhardy without a better idea. And I have personally met with Congressman Chrysler who I think is doing a lot to address the Commerce Department, and his concept is a stronger international trade organization, not a weaker one.

And so I look forward to seeing that construct out of that thrust. But eliminating something that is working before you have a better idea is not good business.

Mr. GILMAN. I am inclined to agree with you. There is some talk of making Commerce—renaming it and restructuring it into an International Trade Department and preserving some of the concepts that you are talking about.

When you sell a satellite overseas, Mr. Armstrong, are you concerned about the security of the technology being stolen, something like reverse engineering or the like?

Mr. ARMSTRONG. No, sir. That is very good question, and it needs to be fully understood so we can get commercial satellites under the right commodity jurisdiction. Let's take the sale of a satellite to China, which I think is a case in point that people would wonder about.

When we sell a satellite to China, we sell it in an in-orbit delivery contract, and we build the satellite, test the satellite, package and crate the satellite and send our employees with the satellite to China where it is not touched by the Chinese, it is under lock

and key in our warehouse. We have 24-hour monitors, 7 days a week to assure that.

It is then transported to a launch site, if China is to launch it, and again, it is impossible to do anything with the satellite. And then it is launched into a geosynchronous orbit, 22,300 miles over the earth, and no one is going to fuss with it up there. So there is no stage in the building, the delivery, the launch and the in-orbit operation of a satellite in which any technology is exposed or can be reverse engineered, as you put it, or dealt with. It is a completely secure asset.

Mr. GILMAN. Why aren't commercial satellites on the State Department's munitions list? Do other countries control their satellites as we do?

Mr. ARMSTRONG. No, sir, they do not control their satellites as we do. And I believe it is on the munitions list as a relic of the cold war, when satellites were feared to be used for purposes other than televising American programming, for other than conducting phone conversations and commercial data applications. Those are the primary applications of commercial satellites. A license approval process still has to take place.

I submit that that license approval process should take place in the Commerce Department for commercial products. If a country applies for an order to Hughes for a satellite other than for commercial purposes, then, of course, it ought to go through the channels of the Department of Defense, National Security Council, or the State Department.

The functions and the technology of a commercial satellite is analogous to a telephone company's wires or a telephone company's switch, or a cable company's broadcast center. What commercial communicating satellites do are the applications of voice conversation, of television transmission, and of data communications. So if we are going to consider a commercial satellite to be dangerous, then we probably also ought to take on cable television and telephones.

Mr. GILMAN. Just one last question. With the European Union of some 15 countries coming on line and an extensive market, I guess in hundreds of millions, over 300 million, do you feel that you may be frozen out of that market?

For example, competing with Alcatel and Siemens?

Mr. ARMSTRONG. I am watching very carefully the European Union and the substance, not just the direction, of the regulation that will flow relative to telecommunications, that hopefully, they don't build barriers, either in the regulation, in their legislation, or in their nontariff barriers that keeps American companies from competing. Because certainly, in America, we have seen the likes of Siemens and Alcatel and Erickson compete very successfully in our telecommunications market.

And so, yes, sir, that is an interest of all of us in the telecommunications industry, satellite and nonsatellite. And we are working hard and we appreciate the interest of the Congress as well as the agencies and administration in communicating to the European Union for an open skies and open market.

Mr. GILMAN. We don't want to happen what they tried to do with the motion picture industry, and we certainly will watch over that.

Thank you, Mr. Chairman.

Mr. ROTH. Thank you, Mr. Chairman.

And we are going to move to Mr. Moran for the next question.

I want to point out, however, as you are well aware Chairman Armstrong, Secretary's Christopher has ordered a study of whether to keep commercial satellites on the munitions list. The study is supposed to come back in September sometime. I know you have a lot of influence in the administration and it might be a wise idea to contact some of those people.

Mr. ARMSTRONG. Yes. I am working with a number of agencies. I am very hopeful that the direction that Mr. Christopher has given to his staff, particularly to Lynn Davis, who is not prone to give up power as tools for foreign policy, will take an objective view and bring these lists that are in the munitions list really out of the cold war and permit to flow to the Commerce Department commercial products, and only for national security purposes protect the kinds of things that can lead to armaments dispersion around the world.

Mr. ROTH. Mr. Moran.

Mr. MORAN. Thank you, Mr. Chairman.

This was exceptionally interesting testimony from Mr. Armstrong. I appreciate you having the hearing.

Chairman Gilman may be aware, but we don't oftentimes—we don't consistently get this kind of interesting testimony sometimes from our diplomatic folk at the State Department and the like.

The issue you raise is a very important one. I am somewhat familiar with it, because I had language put in the House appropriations bill to—actually the report, to try to rectify this, apparently to no avail. It is a classic case of counterproductive foreign policy that had a destructive impact upon our economy and American jobs. And what Secretary Christopher is doing is fine, but it is really—to have a study done is too little and it is too late for Hughes. And what it did was to really damage our credibility with the fastest-growing, potentially largest economy in the world. We had a foothold there that would have developed into a uniquely dominant role, not only in China, but in many parts of Asia, and to not allow that to proceed for the reasons that were given, as you say, it was antiquated thinking, and very disappointing.

I would like to do a—since this is such a classic case, and hopefully at some point some graduate student in a business school is going to do a case study of it, but until that time comes—and I guess the issue is still open, there is still more to write about it, but it might be helpful to do a little "who struck John" on this.

You talked to Mr. Kantor, our U.S. Trade Representative. What was their position?

Mr. ARMSTRONG. They felt their hands were tied. The Commerce Department felt their hands were tied, the Defense Department felt their hands were tied.

Mr. MORAN. Mr. Armstrong, who was tying their hands? I heard that, too, but nobody would tell me who was tying their hands?

Mr. ARMSTRONG. They were saying that they had no—they could state the position, which to Mr. Perry's credit he did, and he did it publicly, to Mr. Brown, he did it publicly, Mr. Kantor did not.

Finally, I had the opportunity at a California economic forum to be invited with 12 other people to a roundtable on CNN, and C–

SPAN with Mr. Clinton. And when it finally came my turn, I just raised hell and made it very uncomfortable, and to his credit, he said I have been made aware of the situation; I tend to agree with you, Mr. Armstrong, and I will ask Mr. Rubin who was then with the National Economic Council, to coordinate looking into this.

And after one hell of a lot of infighting and battles, the State Department decided they had a new legal interpretation which permitted the Hong Kong and Australian satellites to be launched, which was the first problem that we had.

The second problem, of course, was that we couldn't sell satellites, nor could we launch additional satellites, but we got the two that were in the backlog relieved with this.

So I think the thing that could happen that would help get this resolved is that if the President would again reiterate his support for a strong export-driven Export Administration Act and direct the State Department to do something about it. And as you say, there is nothing new to study. It is merely coming to the conclusion that the munitions list needs to be updated and the commodity jurisdiction needs to be negotiated. Very unusual, the Defense Department and the Commerce Department are together in their view on just about all the items. So the issue is whether the State Department is willing to give up its control of commodity jurisdiction. And the only influence that I know in this town is this Congress and the President of the United States over the State Department.

Mr. MORAN. Yes, well, that seems to be the problem. I don't want to belabor this too much, Mr. Chairman, but this is—this is a terribly important issue and it really goes to the heart of what the problem is. Because we have wonderful rhetoric, and I know we have both the breadth and depth of understanding on the part of the President and the Vice President of how important our international trade is. And the expertise on this issue is in defense and it is in Commerce. It is really not in State.

And so it seems as though the problem is that State doesn't want to give up some of its turf on this, and for that reason, we will lose thousands of jobs and hundreds of millions of dollars because of some bureaucratic turf fight, it appears.

What needs to be studied? What are they studying?

Mr. ARMSTRONG. According to the State Department, they want to study all of the embedded technology that potentially goes into a satellite. And if I could use a satellite as an example, there is plenty on this list that needs to come off, and make a determination one more time that it is an acceptable technology to be commercially deployed.

This thing—this turf has been gone over. As you know, we almost got an Export Administration Act passed last year. And if it hadn't been for I think, some staffers on the House Armed Services Committee and in the State Department, we would have had it. And so if we can just get the State Department, the Commerce Department, the Defense Department, to come up with a recommendation that makes sense to exports, we can finally get an Export Administration Act.

Mr. MORAN. How important is a good commodity jurisdiction provision in the new economic export legislation that we are developing at this point? I mean—well, go ahead. You know the question.

Mr. ARMSTRONG. Yes, it is really fundamental. Giving commodity jurisdiction in the right place, and export licensing in the right place, and a properly defined munitions list, is the underpinning of an Export Administration Act that will make sense to the business community.

Mr. MORAN. And you are not just speaking for yourself, you are speaking for the entire industry in terms of what the Export Administration Act needs to include?

Mr. ARMSTRONG. Yes, sir.

Mr. MORAN. You are a spokesperson for the entire industry?

Mr. ARMSTRONG. I feel that I have two roles, one as Chairman of the President's Export Council, and then representing the industry—satellite industry and the communications industry—not officially, but as a member of that industry, that they are unanimous in their support for what I have just shared with you.

Mr. MORAN. Well, Chairman Roth, the Export Administration Act is very important to my district, but it is important to the entire country, to America's economic role in the 21st century. I appreciate you having this hearing, and particularly having this witness.

Thank you, Mr. Chairman.

Mr. ROTH. Thank you, Mr. Moran.

I appreciate your incisive questions and also your ability to identify the nuances in this particular issue. You are going to be a key Congressman in our passage of the EAA, and I think we are going to do it this year, with your help.

I would like to call on another person who is very conversant on this subject and a person who understands the nuances of this issue, Dana Rohrabacher.

Congressman Rohrabacher, I would like to ask you for your questions.

Mr. ROHRABACHER. Just so I won't be accused of beating up on State Department employees over at the State Department, I will go on to other questions than my colleague. I am just joshing my friend.

Mr. Armstrong, I would just like to ask you on a number of issues, but first of all, what role do patent rights play in the protection of your business and your ability to do your job overseas in particular?

Mr. ARMSTRONG. If I may answer that twofold, both patent rights and copyright, intellectual property rights are both very fundamental and important. They would be honored and respected in the conduct of international trade. I represent a very high technology set of industries. Space, communications, defense, automotive, electronics make up Hughes. And we probably have close to 23,000 to 24,000 engineers and scientists. Our investment is that we do things, we innovate, that haven't been done before. That has always been my company's history ever since Howard Hughes. And so to sustain that investment, it is absolutely fundamental that a patent system that is global and the protection of intellectual property rights or a copyright system that is global is part of international trade agreements. And so I couldn't think of something more fundamental.

Mr. ROHRABACHER. In order to obtain a global patent right system, would you support the basically the reduction and the diminishing of American patent rights that we have had for the last 150 years, if that meant a compromise with the Japanese in order to gain their understanding and trust, I think was your word?

Mr. ARMSTRONG. I am afraid I will have to get back to you on that, because I have not been in the middle of those patent rights. I think you are implying an erosion of patent rights.

Mr. ROHRABACHER. I would say not an erosion, but one of the worst attacks on patent rights that I have ever seen.

Mr. ARMSTRONG. Yes. There is a tremendous attack on both patent rights and copyrights. And we just have to stand firm. The more industrialized countries are going to begin to grow and to invest and to innovate and going to appreciate in their own markets the need for this kind of protection. I think the abuse comes mostly from the developing world. I am not aware of today that there is an attack currently by Japan.

Mr. ROHRABACHER. Do you think that the Japanese can be basically trusted to respect American patent rights and property rights?

Mr. ARMSTRONG. It has been my experience—here I have to only speak from my company and my experience, and we do business in Japan in defense and automotive electronics, in space and in communications, that they can be and they have been respectful of our patents and copyrights.

Mr. ROHRABACHER. Are you aware that in the GATT Treaty which you were supportive of and I was supportive of, except for this one provision, I might add, that your traditional patent rights of 17 years of protection was called into question, and that today, if your patent application takes longer than—well, if your patent application takes 10 years for a new technology, that you have lost half of your patent protection before it is issued?

Mr. ARMSTRONG. No. My counsel has not brought that to my attention, sir. So it was my understanding that today with GATT that I have enjoyed the same 17 years that I have always enjoyed, and I am going to just pay attention with that.

Mr. ROHRABACHER. Unfortunately—I would like to have a long conversation with you after this, because we can't do it in this context. But you have lost a great deal of your patent protection overseas and your industry and possibly your counsel has been supporting the change that has diminished your patent protection, and you as a corporate head don't even know that.

Another area, why—that is an area where I am trying to be your protector. Here is an area where I am going to be your adversary. Why should the U.S. Government be a guarantor of investments and business overseas?

Why should people—doesn't this—don't businessmen have to take their own risks when they are out to make a profit?

Mr. ARMSTRONG. We take plenty of risks. One of the risks that the banking system internationally, the private banking system does not take—will not take, and as long as they have an obligation to shareholders, should not take—is the political risks that exist in international markets. That is a risk that we need some government agency to step up to, and when they do, you find then

that banks feel the security is there for them then to take the risk that they have been missioned to take by their shareholders.

Mr. ROHRABACHER. But just to offer you this position. I mean if you have a government agency insuring a loan for a business deal overseas, there is no risk for that bank. The bank is basically being paid off in the sense that there is no risk for that bank at that point. The taxpayers pick up the guarantor.

Mr. ARMSTRONG. If there is no risk to the bank, the bank will make the loan. If there is risk for the bank, the bank is going to need someone to support and guarantee and underwrite it, and in many large projects and in many small projects in developing countries, that political risk and that instability exist, and if we want to compete in those markets, we have to show up with a package program that includes financing, and that is going to include an Exim or an OPIC standing behind private banks.

OPIC and Exim don't provide the complete financing, they step up to bring the stability to the financing to permit the private sector to participate. And in many cases, you find companies like mine taking on our balance sheet that risk with us going out and getting debt, either private banking or international.

Mr. ROHRABACHER. That is to be applauded. I think companies that are willing to do that are keeping in the tradition of American entrepreneuralism and the Yankee Clippers, and the rest of it.

One last question, and I know my time is up, Mr. Chairman, and maybe we will have a second round or something. But if, indeed, the American taxpayers are stepping up to the plate and standing beside our businessmen who want to do investment overseas by creating some sort of political guarantee, in the sense that there is political instability, why should we be doing this with dictatorships? And isn't—don't we stand for something that the U.S. taxpayers aren't at least going to be saying that will help our businessmen who do business overseas, which, by the way, I think is questionable in and of itself, but at the very least, we should not be aiding in someone doing business deals with a Mussolini or Mao Tse-tung or someone like that?

Mr. ARMSTRONG. Respectfully, the Congress or the President feels that the country should not trade with another country——

Mr. ROHRABACHER. With a dictatorship.

Mr. ARMSTRONG. Dictatorship or whatever kind of ship, then it should so promulgate the appropriate law and regulation, and we will abide and respect it. What I object to is to use businesses to conduct foreign policy by placing that responsibility on us. That is why we elected you.

Mr. ROHRABACHER. That is very well said, and I hope that my colleagues take that to heart, because I certainly do. And would I like to talk to you at some point about patent protection, because it is very important to your business as well as to the competitiveness of the United States.

Thank you very much, Mr. Chairman.

Mr. ARMSTRONG. I look forward to that.

Thank you.

Mr. ROTH. Thank you very much, Mr. Rohrabacher. We appreciate your incisive questions.

Mr. Rohrabacher is our expert on patents.

Mr. ARMSTRONG. I just learned that.

Mr. ROTH. He knows all the ins and outs. I got quite a tongue lashing from him when GATT was up and patent rights issues were involved.

Mr. ROHRABACHER. Only on patent rights.

Mr. ROTH. So far as tongue lashing.

Mr. ARMSTRONG. He has an important point.

Mr. ROTH. And Chairman Armstrong, we have on this committee people who are well versed on the key issues. Another is Congresswoman Meyers, who is the chairman of the Small Business Committee in the House of Representatives. We always take her counsel very seriously, because small business is the backbone of this country. Congresswoman Meyers.

Mrs. MEYERS. Thank you, Mr. Chairman.

Well said, on the week of the White House Conference on Small Business. Very good.

I would like to ask a question, Mr. Armstrong, with about national security. It has been hard for me to figure out over the last couple of years since I have been a member of this committee, why our export policy is so much different from the rest of the world. You give the example of Germany picking up when you could not sell your satellites to China or launch the satellites for China. But why is Germany not concerned? And it has occurred to me that perhaps it is that if a fire gets started in some place in the world, North Korea or Pakistan or some other place, it is the United States that gets called on to put that fire out, and it is not Germany.

You have indicated that the State Department is the problem. But in my experience, and maybe the experience of the other committee members is different, but it is not the State Department that comes to my office, it is the National Security Agency that comes to my office.

If we are simply punishing another country for taking the wrong step and selling technology they shouldn't have to Pakistan or North Korea, that might be the State Department. But if it is concerned for security, I think it is the National Security Agency. But you don't see the National Security Agency around talking in public. What you see is the State Department. And so people always blame the State Department.

Now, can you give me your insights on that?

Mr. ARMSTRONG. You put me in a difficult position of defending why we have unilateral sanctions and who is really behind it, and since I am so against them, I will do my best. I suspect that whether it is the National Security Agency or the State Department, they feel that this country is obligated to a degree of leadership in a more civilized world and to stop the spread of armaments and nuclear weapons, and I support that 100 percent.

It is the means versus the purpose and the end that I am quarreling with. I quarrel with the means. Unilateral sanctions, whether they are from the National Security Agency or from the State Department, have not in history ever proven to change errant behavior, and particularly if the sanctions are on American business.

I mean, it must seem absurd to anybody that if there is a third-party country conducting errant behavior that we will lay off

20,000 people in California to teach them a lesson, it just doesn't have a connection.

If we are going to have sanctions, let's punish the country that we wish to change the behavior of, and let's have multilateral rather than unilateral sanctions, which means that we have got to get out of our desks and on the airplanes, and into the foreign capitals, and present the information and go through the tough negotiation, and bring on board our allies to also conduct economic sanctions. Because only multilateral sanctions will work if they are economic. And so I can't defend it.

Mrs. MEYERS. Well, I would agree with you about multilateral sanctions, because I know that at times we have sanctioned people with agricultural products unilaterally, and Europe picks up the market or Canada or Australia or somebody else picks up the market, and we never get it back again, and so I understand what you are saying. It is just that I always do have this concern that we may feel greater responsibility in terms of national security because it is probably going to be American lives that are lost if some kind of an international conflict starts. And I—it is really a difficult balancing act.

Let me ask, what percentage of the world market for information services does the United States have? Do you have any——

Mr. ARMSTRONG. You know I don't have that statistic at my fingertips, but I think you have another speaker from an information technology company, and he might be better able to address that.

Mrs. MEYERS. Well, I just want to thank you very much for being here and say that, for the most part, I agree with you. It is extremely difficult and it is as difficult for small business as it is for your giant business when we have a really restrictive export policy. So thank you very much.

Mr. ARMSTRONG. Thank you.

If I may just comment? I think it would be a wonderful era if we could have the ability to be a small businessman and be an export entrepreneur, but we don't have the kind of support today to make that easy to happen.

Mrs. MEYERS. Thank you, Mr. Chairman.

Mr. ROTH. Thank you, Congresswoman Meyers.

Speaking of small business in exports, every year, I have an export conference. We have about 1,000 people attend. We have had it for the last 10 years in northeast Wisconsin. It has helped a great deal. I am going to try to get other Congressmen to do the same.

We bring in people from the Commerce Department, Ex-Im Bank, and so on. It helps American small business people, who contrary to popular belief, would love to sell overseas if only they knew how they would be paid and how to get entry into the markets.

I am curious, what is that satellite dish on your desk?

Mr. ARMSTRONG. Thank you, Mr. Chairman, for asking. I thought it might go unnoticed.

I brought that to demonstrate a significant piece of communicating commercial satellites. This is an 18-inch dish that receives from satellites in this country now 150—we just launched a third satellite Friday, so it will be 200 channels, of digital television. And we are taking this technology internationally.

We have already announced in Latin America, and we are in discussions other places. This is the kind of threatening technology that can be affected if we don't change the munitions list, if we don't get commodity jurisdiction where it belongs, and if we don't have an open skies policy in terms of our telecommunications deregulation.

I couldn't bring a satellite and put it on the table, so I thought nothing could be more vivid than something that is today a new technology that is opening up tremendous choices and programming here in America, that we believe can be brought internationally for very little cost for very high quality of transmission globally.

Mr. ROTH. Let me see if I understand this; 200 television stations anywhere in the world?

Mr. ARMSTRONG. Yes. Today, the satellites that broadcast in the United States are in a 101-degree position that optimize the Continental United States. We will be putting up another satellite that will beam to Latin America, 72 channels to Portuguese-speaking Brazil and 72 channels to the rest of Spanish-speaking Latin America.

If we were to do, say, Japan, that would be another satellite in Japan; similar capabilities, similar architecture, similar engineering, similar economics, similar band width and quality of picture and communications. And so yes, this can be both in a continent and we can link continents, if there is a market for that.

Mr. ROTH. How am I, then, as a Congressman, and these other Congressmen, supposed to have control over what happens if you have all of that technology out there?

Mr. ARMSTRONG. Well, the control happens the day the license application is made. The Commerce Department, I hope, would review the license. Let's say Japan would like to do. They have applied for an orbit slot and they have applied for a frequency allocation, and they have applied for a set of applications to use that frequency. And so the international consortium would approve that orbit slot, since that is a global space that has to be allocated in that spectrum. Our application for license approval would go to the Commerce Department. They would see the applications, and if the applications are for things like television and telephones, they would say that is perfectly all right. If the application was for something that was noncommercial, it would probably end up in other departments for their review. That is how you control it.

Mr. ROTH. You know, I am just curious about that. You know, you are a powerful man. Suppose you get upset with Rohrabacher and Roth and some other people in Congress and say, "they are giving me too much hassle, I am going to go to Mexico and set up business in Mexico." If you go over there and beam in everything in the United States, we have no control over it. Is that possible?

Mr. ARMSTRONG. It is possible, just like on cable, or just like over the telephone, or just like in the publishing industry, you have the same amount of control. This is a medium, just like those mediums, and to the degree that the country censors what goes over the medium, it would apply to this as well. It is no different.

Mr. ROTH. Well, I——

Mr. ARMSTRONG. In fact, can I just give you a little sales point on this medium? Unlike telephones and publishing and cable television, in our set top box, we have a parental supervision program built, so that if mom and dad want to restrict what comes into the house, they have the complete flexibility to do that, so the kind of programming that they want for their family and their values is programmed right at the household level.

Mr. ROTH. You know, in theory, that is really great. I like that. The only problem is in the practicality. We have in our home a number of computers, for political campaigns, and so on. I have to ask my kids to come in and set it up for me. So if I were to put that into the computer, in a couple of days my kids would find a way around it, I am sure. But anyhow, it is great technology.

I have been working on this Export Administration Act for a number of years here in Congress, and you are right, the turf battles really are the most difficult to overcome. But I know that President Clinton is very much in favor of doing something with the Export Administration Act this year. Given your position with the administration and in business, you are a key person. I know that by working together we are going to be able to overcome these things. There is an old Russian proverb that says: Two mountains can never come together, but two men always can. And I think that is going to be the case this time.

I am very appreciative, Mr. Armstrong, that you have come all this way and taken time from your busy schedule to go over this with us, because I think it keeps us focused.

Mr. ARMSTRONG. Thank you, Mr. Chairman. I am honored to have been asked.

Mr. ROTH. I have to give Mr. Rohrabacher a chance to ask another question.

Mr. ROHRABACHER. Thank you very much.

In Toby's house, in fact, his children actually are managing to keep what he sees—anyway, I would like to ask a little bit about what you were mentioning in terms of the Australian and the Hong Kong launch on the Chinese rocket system, and to put it in perspective, I did support your company's request to be able to launch on the Long March Rocket System.

Mr. ARMSTRONG. I know that, and I appreciate it.

Thank you.

Mr. ROHRABACHER. And I think that that type of competition is a very good thing in the sense that we have to come up with a better product. But hasn't the Long March Rocket System blown up frequently, and did they have your satellites on board? You should have used an American rocket.

Would they have permitted a launch with an American rocket? Instead, they just had everything blow up.

Mr. ARMSTRONG. I should clarify that. We have had explosions with the Atlas; we have had explosions with the Areon.

Mr. ROHRABACHER. But never with the Delta.

Mr. ARMSTRONG. The Delta is the best.

Mr. ROHRABACHER. That is right. It is manufactured in my district.

Mr. ARMSTRONG. You might have noticed that we just cut a new deal with McDonnell Douglas on the Delta III.

Mr. ROHRABACHER. I was going to congratulate you on that, which is again an example of American business working together, not because they have to, but because the American companies are providing the best product and the best alternative.

But in terms of Chinese launches, do you—there is a risk inherent in using a Chinese launch system; is that right?

Mr. ARMSTRONG. Yes. The best performance record is Delta from McDonnell Douglas. Until the Delta III, that they just announced with our memorandum of understanding for 10 launches, to kind of finance that into reality, the next best was Areon from the French, and then the Atlas—which was General Dynamics, and now is Lockheed-Martin.

The Proton from Russia, and the Long March from China are higher risk and higher cost in terms of insurance often, but they have lower launch cost.

Mr. ROHRABACHER. Did the Chinese, for example, demand that if we make the sale, you have to do it on our rocket?

Mr. ARMSTRONG. Yes. In China, if you sell the Chinese a satellite, they specify a China launch.

In the case of the Australian, which was an Optis B–3 communicating satellite, with a partial ownership of Bell South, there the Australians specified a Long March launch.

Mr. ROHRABACHER. Did that get blown up?

Mr. ARMSTRONG. No.

Mr. ROHRABACHER. That made it up?

Mr. ARMSTRONG. It got quarantined. It got blown up, and this was the second one, and then it got quarantined by the sanctions, and then eventually, it went up successfully.

The second one was the Hong Kong satellite. Generally speaking, in the satellite industry, the customer will specify the launch unless he writes a contract with us to deliver the system in orbit. Then we take on the responsibility for the launch selection, the launch cost, and the launch insurance. So in many cases, the specification of the launch is by the customer.

Mr. ROHRABACHER. Well, I have never believed that we should take an industry like your own, which is flourishing and not only competitive, but a world-class industry——

Mr. ARMSTRONG. Thank you.

Mr. ROHRABACHER [continuing]. Then tie it to perhaps another industry, our launch industry, which is not quite as modern and has not kept up with the times.

However, I am very pleased that American—McDonnell Douglas has produced a system that is of such quality and basically is able to do the job with the least risk, even though it cost a little bit more, that you have chosen to deal with McDonnell Douglas, although I believe that you should be free to make your choices based on what you perceive is the best thing for your industry.

Mr. ARMSTRONG. I really appreciate your support on that, because there are some in the administration, the USTR, for example, who thinks that quotas are the appropriate vehicle to regulate and demand and protect the launch industry, rather than competitiveness.

Mr. ROHRABACHER. No, we should not bring down our best industries and tie them to our less competitive industries.

Mr. ARMSTRONG. Thank you.

Mr. ROHRABACHER. Because that way, we have a lower quality in the overall.

Mr. ARMSTRONG. You are right about that.

Mr. ROHRABACHER. With that said, again, I would like to talk to you about patent rights.

Mr. ARMSTRONG. It's a deal.

Mr. ROTH. Thank you.

If there are no other questions, thank you very much.

Mike Armstrong, it is always a pleasure to be with you, and I appreciate your testimony this morning and also your excellent exhibit.

Mr. ARMSTRONG. Thank you, Mr. Chairman.

Mr. ROTH. Now, we are going to ask John Gage, Chief Science Officer of Sun Microsystems to come up and take us around the world. He told me that the first place he is going to take us to is Moscow.

STATEMENT OF JOHN GAGE, CHIEF SCIENCE OFFICER, SUN MICROSYSTEMS, INC.

Mr. GAGE. Thank you very much, Chairman Roth, Chairman Gilman, Congressman Rohrabacher, Congresswoman Meyers, it is a pleasure to be here.

You see, we brought some wires and other devices here to completely support what Michael Armstrong just told you regarding the success of one of America's most outstanding companies and one of America's most important industries.

The only criticism I would make of Chairman Armstrong's presentation is that he did not tell you how revolutionary this chip is. Almost one million Americans have bought this in the past five or six months, and it allows someone in any part of the country—even in the most remote mountain or rural area—to be connected to the world for about six hundred dollars.

Now, we have discussed the onset of the computer industry, with the first of these small chips developed by Intel in 1971. Well, twenty-five years later, the increase in speed and decrease in price has advanced us by a factor of one million in performance. That is an enormous number, and that is why the United States of America dominates the world industries in computing and in telecommunications.

What I want to show you here is the revolutionary change implied by this Hughes satellite receiver and the wires that you have coming across this floor from the U.S. Congress linking us with twenty to forty million people worldwide in every country in the world.

Thus, there are questions about access and control that I will want to mention. For example, it is illegal to have such a receiver in Singapore. So, three days ago, when the rugby championships were going on in South Africa, speedboats carried videotapes from Indonesia to Singapore, so that the sports fans could see the results of the games.

Now, in the U.S., however, every American citizen with a television set—linked either to a satellite or to a local broadcast can

see something of interest, as can every school. Now, using these wires and these satellites, every school can be linked to the world.

I wanted to start with this incredible change in technology. I will show you some things and give them to you to look at. I think that what I will probably do is pick up this microphone and walk toward you.

Let me just describe what we have here. That is another supercomputer. Two years ago, by inserting a chip, a board with a chip on it, the computer on this table in this room went from being essentially a PC—being the speed of the PC next to it, perhaps a little faster—to being a supercomputer. That was the level of ths definition of supercomputer at that time.

So I take one of these boards—what we excel at making in this country—and this is a supercomputer just on this board, by today's definition. All you see here is a board with something plugged in to it right here, and the computer is right there. There is a chip under there.

This takes all the heat away. That is what all this is for.

The second one goes right here. So this board is one of ours, and Hewlitt Packard makes one just like it. DEC makes one, IBM makes one. You can just pass this along.

This is a computer board into which you plug processors which speed it up, depending on how fast they are. All of this is just cooling on the top, because these things get hot when they are running. This is memory here; this is the processor underneath there; these are other little chips that connect it all together; and all of this links it by this out to the next one.

So you take one, it is at a certain speed. You add another one, double the speed. You add another one, double again. Now, let me show you the chips.

Here is IBM's version. That is a chip which will go on a board just like that under these. Here is our version. There are two processors here. You can plug them in right there on that board. This is, I think, the DEC version, and this is the Intel version. There are a lot of pins with a little tiny processor in them.

Now, you make a supercomputer twenty years ago, the Cray 1, and its power will be surpassed by Christmastime by Sega, and Nintendo in some graphics operations—not in everything. This December, with these new games, they are faster than the graphics on the Cray 1.

What we wanted to show you here in this box are four of those boards. Two years ago, by installing two boards it surpassed the supercomputer limits. So you raised the limit by a factor of four. And I said—well, the arithmetic of the entire computer industry is exactly what Chairman Armstrong said—every eighteen months, the speed of this doubles.

I can tell you to the day, or at least to the month when I will be back here again, that if you raise the limit by four, eighteen months plus eighteen months—I will be standing here saying that here is a box made by every computer company in the world, with parts that you can buy anywhere in the world that plug in, and it will surpass the limit.

So here I speak for the American Electronics Association and for DEC and IBM and Intel, and all of the computer companies. These

limits, which were the remnant of a way of thinking about control of twenty years ago, do not make any sense to us today. And uniformly, all the chairmen and executive officers of all U.S. computer companies support the position that this ceiling should go away, and we will give you the formal statement of that. I know I state it informally.

So that is inside a single box. That is very important. Anybody can make it and does in every nation. In Korea, in Singapore, in South Africa, in Beijing, people take those chips from Intel—which you can buy on any street corner, Intel is building a new plant in Shanghai to build these things, to dominate the Chinese market, which is a good thing for Intel.

Well, you can buy those chips, put a lot of them together and create your own supercomputer. And what supercomputers do—this is the space shuttle—is model the space shuttle coming down into the atmosphere and model the heat. That is what supercomputers do. And it is happening at this instant right there. This is far more powerful than what the Cray 1 did, and it is just running here in this box.

Now, the network means that this box does not have any walls anymore, because all I do is take a wire—here is a wire coming to your computer. This wire going to the PC and this wire coming over to this machine, link us out through this wire going to the room just next door into the congressional network, which links us to the world.

So if I start something computing here to show the space shuttle going into the atmosphere and heating up, and if I take part of that computation and move it out across the wire and have it done to the Cray sitting in Minnesota or in a jet propulsion lab or the National Center for Computer Operations, I am sharing this computation. So in some sense, the world of interconnected computers is one big computer.

The old idea that technology is retained inside a container and that you can stopper it does not work anymore. We lived in this world when we started Sun twelve years ago. This is how many people we were right here, and we were academics from Stanford, Berkeley, MIT, and Cal Tech that started a little computer company.

We are now about six billion dollars. We dominate the Japanese market, and we are building the networks throughout the world that change the way people read and write and see things.

Mr. ROTH. How many are you now?

Mr. CAGE. We are 15,000 now, and we are worldwide. In fact, we are second only to Boeing in our sales that are outside the United States. These are used to design things, to build bridges, to build dams, to build waterworks, to build circuit boards, to build chips. That is what this large screen does.

These were used to control Desert Storm; all logistic support for Desert Storm was done on these machines. They are used to do all trading, because they bring a lot of information to the screen rapidly, which is what we would love to do with the Congress as we go on. They are all linked on a network. We just plugged this in this morning.

What I wanted to show is how—from your seats—we can go to China. We can go to the Institute of High Energy Physics in China, or I can wander through every laboratory in Japan and hire the smartest people and make them contribute to a U.S. product, and all of this can occur across the network. So there is a kind of solvent force here.

In the world of computing—you can't think of it anymore as being inside a box. Now, if I took out one of the boards there, and plugged those two together and put that new board in there, this would now surpass the current supercomputer definition, meaning it would need an armed guard.

I was going to make a joke about Congressman Lantos and say that if you are a Hungarian, you are from a country that has controls, and you can't come close to this machine. Well, the idea that all of this has to be accompanied by a guard in export makes it similar to one of those satellites and many millions of dollars, except these things cost $50,000 to $100,000, and they are made by everyone worldwide.

So, to give you a sense of this dissolving of boundaries which brings up very complicated questions, what does export mean if there are no boundaries? If I can start a computation, as was done just a few months ago, 1,600 computers worldwide worked on the RSA algorithms and cracked an RSA encoded file.

They were worldwide, all connected on phone wires, and they were able to partition or divide up the computation so that they could all take part. PCs helped and Crays helped—a variety of different machines all working together on one problem making the entire world a computer.

The foundation of encryption lies in creating a key that can then transform your text into something that is garbled. With the old form of encryption, you had one key and you kept it here, then you sent the message encrypted with it, and somehow, you had to get that key over to the other side. That is why there are carriers with handcuffs or enigma machines that do this mechanically. The other side uses the same key to decrypt.

Today, there is a new form of encryption that is different, where keys are in pairs and one undoes the other one. It is called Public Key Encryption, and I can go into this shortly. There are three people at MIT who created something called the NSA algorithms, which you hear about when the NSA comes to your office, and it is a very hard problem to crack. That is hard, meaning how long does it take a computer to work on it?

Well, if you can encrypt with something that will take 1,000 years to decrypt, you feel pretty secure. If you encrypt with something that takes ten minutes to decrypt, you shouldn't really care a lot about that information. It shouldn't matter too much.

This is a constantly moving target. The demonstration that you could take 1,600 machines worldwide and crack one of the most secure encryption algorithms factored 129 digit numbers, the foundation of this. It made everyone suddenly wake up to the fact that encryption is a very fundamental topic in all U.S. commerce.

It is security and privacy for U.S. business, it is security and privacy for individuals, and anyone that told you where it stood a year

ago is wrong today. It is one of the problems we have again in export.

If you live in England and would like to keep your password secure, we are banned from sending you the ability to encrypt your passwords. You can't be secure.

What if you are a bank and you are trying to do international business? You must have some form of encryption to provide security. So it is a constant battle.

In the march of technologies, three weeks ago on the network, we could do it from these computers and maybe we will. Some people put some algorithms on the network that take a sound-blaster card—that is just a little card that you can buy for a PC that let's it talk to you, you now hear. And maybe in the Congress you should put a sound-blaster card in that PC, run this software, use it as a telephone, and you have as secure a telephone conversation as President Clinton does with the Joint Chiefs using a Secure Telephone Unit three, a STU–3. So this is STU–3 for Chairman Roth's children, who can have private conversations with anybody in the world, and it would be very hard to figure out what they said.

Mr. ROTH. That is bad.

Mr. GAGE. In a way, what I talk about doesn't matter too much for us, but your children are the ones that are going to use this to build the new industries, and that is what is so important about it. That is why we are here.

Two years ago when I took this board and I built a supercomputer, we jumped the limit from whatever the number was, 400 to 1,500 or something. And so now, things that we make and that everybody else in the industry makes, will have to come in for special—by September or so, people are shipping these devices. That board you have in your hand ships in September or October, and at this point, we are now illegal. So I thought what I might do is—if I could do this—I could walk up behind you and help you browse, or I can just stand here and talk. Should I come up behind?

Mr. ROTH. You know, what is so exciting about this is to project what the world is going to be like in just 10 years because of this technology. For those of us in Congress, especially in the area of business, the question is going to be how can we pass legislation that is going to be relevant in 10 years. Don't you think so?

Mrs. MEYERS. Yes.

Mr. GAGE. I have to apologize to the press. I couldn't quite get a cable long enough to get a Mac or a PC over there, but I will show you how it works.

Why is it important? Because you are in a new business right now. In another month, the New York Times begins using just what I am going to show you. All of the newspapers of the world are being published internationally for 40 million people or so.

Mr. ROTH. No, no, please, go ahead.

Mr. GAGE. All right. What you see on the screen—and Jim, why don't you go down and do the same thing on that machine so the people down there can see.

The University of Rochester, just to show people things, put up a map of the world. Now, let me describe what you are seeing, and Jim will show it to people down there.

This piece of software right here on the screen is free. It runs on PCs, it runs on Macintosh, it runs on everything. This is now 10 million copies worldwide in the last 5 months. It is a revolution in publishing. And it makes a page sitting on any computer appear typeset like this on your screen. It is like a Life/Time Magazine. So, here, the University of Rochester said, let's go someplace. Let's go to Asia.

If I click here, it sends a message out across the network and it receives back—this just came from Rochester—a map of Asia, and here we see all of these countries.

They did it graphically, so you don't have to type anything. If we go to Japan—we can go to China, let's go to China. It didn't find that page. Let's try Japan first and then I will take you to China by a different route. So we are now going around the world, we are asking someone in China—or in Japan to send us—that image just came from Japan——

Mr. ROHRABACHER. When you say this came from Japan, what do you mean? Over the telephone line?

Mr. GAGE. A mixture. Some of it may be satellite, you can't tell. They are all little packets and they pick different pathways to travel.

Mr. ROHRABACHER. How much does this cost?

Mr. GAGE. The way the Internet works, you have a computer, I have a computer. You pay for my link to you, you pay for the next link, and we each carry each other's traffic. So as a company, we probably spend $5 million to $10 million just paying a phone company for links, fast links, slow links.

Mr. ROHRABACHER. Who is paying for this link?

Mr. GAGE. For this link, the Congress is paying for a local phone call, and it goes to a computer down here in Washington, and they in turn link to somebody else. So all you are paying is your local connection.

If you want this at home, five computers, $15 a month to any number of vendors, PSI and others, $15 a month and a little modem that costs $50, and you are on the Internet. Fifteen dollars a month, and this would come to your screen at that speed you just saw.

Mr. ROTH. So you don't need Encyclopedia Briticanna anymore.

Mr. GAGE. In total, it is now on the Internet. If you would like to have the entire Encyclopedia Britannica, we could do it from right here. When your child writes that report on soccer, pointing to the encyclopedia article. Well, let's go somewhere. Where is Tokyo? Let's just pick a random—Kobe, right here. Kobe, it goes across the Net.

We had a severe earthquake. This just came from Kobe City, University of Foreign Studies. So here is a page; let's see what else they have here. Details in case you would like to go there or meet the people, and go see who the people are. They are still making pictures of them. So let's go to the Kobe City page. It will come from Kobe. Here is a message to the people of Sakhalin. S-A-K-H-A-L-I-N.

Mr. ROHRABACHER. Except this is in English.

Mr. GAGE. They figure that most people they are talking to here are speaking English. It is multilingual, though. The Russian service—let's go to Russia.

Here is a Russian map—I just did this this morning. It is going to Moscow, see MSK dot SU, Soviet Union. Here it says: Welcome to the map of Russia. I know this is fascinating the audience, but we are having a good time here.

All right, this is a map of Russia. Each of these little red—here is St. Petersburg—and all of these are places in St. Petersburg, or here in Moscow of this enormous shift. For example, the people that built all of the satellites for the Russians, they started a company, here it is, it is called Elvis. I guess they are rock and rollers.

That is a long way away, Kashan, all of the nuclear people that we worried about, and nonnuclear people are creating companies now. You see, right now, that is Cyrillic, except I don't have the fonts on this machine. But trivially, I could put up the fonts and then you could read the Russian. How is your Russian?

Mr. ROHRABACHER. This is something about McDonald's hamburgers.

Mr. GAGE. I think it is about dry dock number one.

All right. Let's go to English. Go to Moscow. This enables a small business in this group, some of the best engineers in the world, to create a company and collaborate internationally.

We decided we would just hire the entire group that built all Russian supercomputers. They work for us now. So what they developed under great secrecy, why the National Security Agency spent a lot of money spying on these people, now all of it is open and accessible, and we can use it to build American technology, which we are. We could find out about the company and what they are selling.

They have very great problems. They are cultural. They don't know how to build things and sell them. They know how to build them, but without the notion that you would actually market something. So wireless computer networks facilitate this. They are the people that built the little hand-held KGB Afghanistan sets, and now they use them in Washington.

So when the satellite would come over—they have the low earth orbit ones that are only about 100 miles up. Something like a little Nintendo game has enough power to go up to 100 miles. So the KGB would put in a message and it would go up to the satellite that passed over Washington.

Mr. ROHRABACHER. They are selling those now for what? What do they do with those?

Mr. GAGE. People need to be able to connect—I hate all of these wires. I would just like to put a little antenna on this, and then it would speak to the other computers and go through the walls to reach any building that is a national monument and can't go through the walls—any building, for example, like that one that is wired in violation of the U.S. electrical code, I mean, things like that.

Mr. ROHRABACHER. So Elvis—Elvis is selling that type of——

Mr. GAGE. So Elvis is selling that. They are spread—Spectrum Direct, they are some of the best antenna people in the world.

Their little antennas could be placed on top of a PC like this one to receive and send. You need something like that, the smaller the dish, the more power in the satellite. But if the satellite is very close, you don't have to have as big a dish or as big an antenna. In fact, 2 years ago, for House telecommunications, I put an antenna on the roof here that belonged to the Russian rocket forces and linked Rayburn to Moscow over a Russian satellite.

The only person that was curious was the Capitol Policeman that came up at one o'clock in the morning saying, "What are you doing?" We said we were connecting to the Soviet rocket forces' computer in Moscow, and he said, "Oh." And that was it.

Here is a Russian that is talking about frequency hopping, spread spectrum—all that means is that you are able to do the most advanced military technology, and you suddenly use it in a civilian business. This is good, because if you can do that, the people that build this don't go wondering off to North Korea or Libya or someplace.

So we have just gone to Moscow. Let's go to China.

Now we are going across. Exactly what I am doing, you could do in ten minutes—I am exaggerating—half an hour from now on the PC in your office, because this is going through the House connection to the Internet. And the big thing about this is—here is someone in China who can do the same thing.

Can the Chinese authorities stop it? Very difficult. If they want to read what you write today—the Speaker has placed all of the Congressional Record on the Internet, readable by ten or twenty million people worldwide—they can watch democracy in action. They can watch people not sleeping and writing legislation, and they can watch it all from anywhere in the world.

Here we will go to China. That is the Chinese flag. There is another mirror of it they duplicated here in the United States. So we are going off to a place in China that just came from China, the Institute of High Energy Physics. And they moved it to some other location, so we will click there.

Let's see if we can—maybe we have to get the mirror. The Nobel Laureate from China, the physicist that teaches at Columbia, is a man that runs this institute. This is a center in China that has wired all of Beijing. Hundreds of institutes—the libraries—are all linked. And when, as things change in China, all that becomes accessible to the outside world, it effects a cultural change.

There is nothing that the administration can do to—here we go. General Information. Introduction to computer networks in China, E-mail addresses of Chinese scientists. You wouldn't have thought of this a year or two ago. So there is an international conference, the Fourth World Conference on Women in Beijing in September. Let's find out about that. It says it can't reach that for the moment. Maybe they have canceled. No. Well, let's go to the Chinese research institutes.

The Development Research Center of the State Council, the Institute of Science and Technology, Institute of Modern Physics. This list was about half this size a month ago. It just can't be stopped, it is reaching out. And it doesn't matter what pathway it takes, satellite, telephone wire, radio or cable. In a way, it is very silly to name industries by the kind of wire.

Mr. ROHRABACHER. So, to get this information from China, what it would cost us is a local telephone call and the technology?

Mr. GAGE. That is it—and it is free software. I left it down below. I have a memo down here. The memo is signed by the Secretary of Defense and the head of the CIA, and it says: Speaking for DOD and the intelligence community, it has been a disaster—it doesn't say that exactly, but it has been a disaster—nobody can communicate with anybody else. Here it is; it was signed by Woolsey and Deutsche, and now it is Perry and Deutsche. So it says: Based upon the success of Intelligence Systems Secretariat, we are going to declare this Intel Link—that is just the software you are seeing free, and runs on any computer, that allows the combination doors and the missions abroad. They can watch the Haiti data. They can watch the rescues. All of the data that comes into DOD and intelligence can now be shared.

This is a big change. Now here we are in China, and there is a picture of the building that this transmission came from. This server is in Chinese, ours is the English version.

Mr. ROHRABACHER. What we are getting here comes from that building?

Mr. GAGE. That building sitting, sitting in Beijing just sent us the picture.

Here is a picture of whoever runs the place, and I don't know what this says. I am sure that it says that we are in an important and friendly place. But this is trade and commercial information to which businesses worldwide can link.

For us, we have to hire the smartest people. The general ratio is that you have one smart people and nine other helpers to start a small business, at least in technology. Then, after a while you get to be bigger and you have 100 people, but still with only one really smart person. Then in a company of our size, it is diluted, maybe one thousand per one, so it is getting worse. That is why new companies spin-off, because people won't put up with such meetings, and they will go off and start a new company.

This technology allows them to go off and start a new company gathering the intelligence of people worldwide. Now you are looking banking, where this encryption is a big deal. Using this public key system, there are two keys to encrypt things.

One encrypts, the other decrypts. You have to have both, so I am going to put one of them in the phone book.

There is my name, Gage; I have my public key published there, and I keep the other one secret. It is on a smart card or something that I keep secret.

I am going to send you a message, and I want you to know it came from me. So I encrypt it with my secret key, send it to you, you look up the public key in the phone book, and use it to decrypt the message. It had to be from me because I am the only person that has the other key, unless someone knocked me on the head and stole it.

Suddenly, this is a digital signature for all of the law of commercial paper, deeds, and trusts; Let's say I am the bank. Let's do it twice. You have your secret key and your public key; you publish the public key in the phone book. I look it up, and encrypt a docu-

ment with your public key. I do it again with my private key. That is twice now.

It is doubly gobbledegook. I send it to you. You decrypt first with your private key, still gobbledegook, you decrypt again with my public key that undoes my private key. When it comes up clear, what do you do? You know that it came from me and only me, for you and only you.

This is what the New York Times will do to control circulation.

If I am the bank, say Citicorp, and I want to sign a certificate that says this is good to borrower, $10,000, signed Citicorp, you could look up Citicorp's public key and verify that Citicorp signed it. If you believe in Citicorp, it is money.

Now, one or two more crank turns of this, and you can do it anonymously. Here is a dagger at the heart of government. The IRS doesn't like this idea much. But with anonymous transfer, there are no national boundaries now. So someone in China could buy something, whoever is on this computer sitting in Beijing could send an order across the wire to buy Chairman Armstrong's testimony, or tomorrow's New York Times, or software or something.

Mr. ROHRABACHER. What do you think the implications for this are in terms of the way government functions?

Mr. GAGE. This comes from my frustration in my town trying to find out why a school board almost went bankrupt. I can't go to the meetings because I work.

The meetings are poorly run, and the accounting systems are designed so I can't understand them, but I know we own a certain number of buses. A page with the accounting system here replaces the newspaper, I now as a citizen can see what my own public entities are doing; I can participate.

Here is one of the problems. People don't participate because they can't feel they can find out anything.

Let me show you one quick thing that is different, very different. We are going to go to San Diego, if I can.

This has 663 cities on line. Austin is on line, Seattle is on line, Aberdeen is on line.

We can wander Africa or we can wander Wisconsin. I don't know why I picked Wisconsin, but I just thought we could go there.

Mr. ROTH. A progressive State.

Mr. GAGE. So, Belleville and Madison, the Wisconsin K–12. Now, here is a fundamentally important thing. The kids sitting in my Wisconsin school, we will see how many are on the network now—just for a phone line.

It is a shame, because something like 90 percent of American classrooms don't have a phone line, but if you can get it to the principal's office, then what you will find—come on, Wisconsin, wake up.

Mr. ROHRABACHER. Wake up, Wisconsin.

Mr. GAGE. California, of course.

Mr. ROTH. There are so many schools on them in Wisconsin, it takes the computer time to——

Mr. GAGE. Here they are. Wisconsin, Belleville Elementary, Belleville High School, Madison Middle School, the Wisconsin Department of Public Education. All right.

Pick one.

Mr. ROTH. Well, take Madison.

Mr. GAGE. Madison Middle School. We are now speaking with the kids, they are publishers. New York Times, watch out, because they are bypassing, they are just saying what they think about life in Madison.

Well, now, what is life in Madison like? The school mascot was drawn by Matt Bohannen. So he is now a published artist in the world.

Does he care about intellectual property? You bet. This is the first education for a kid about what it means to have—when we hit this page, it said, this is coming from someone, the Congress is reading your page.

When the Wisconsin schools did this about 8 months ago, this class did a lot of reports. When you read them, the log files a record of who comes to touch your page. When we hit this page, we sent a message over to that computer saying: Hi, we are this computer. Each of these has an individual name.

Mr. ROHRABACHER. So these kids at the school will look at their computer at one point and punch a button and it will say someone in the U.S. Congress was looking at your page.

Mr. GAGE. Exactly. And Singapore did, and Beijing did, and Uruguay did, and Argentina did, and South Africa did. Each kid put their poetry up and held a contest about which poetry was read by more countries.

Mr. ROTH. Wait until we send him a message back.

Mr. GAGE. Here are student projects, health issues, community service, nursing home visits.

All right, let's find out about nursing home visits. On the first Thursday of every month, Mrs. Pupour's seventh grade class go to visit residents of St. Mary's, and there they are——

Mr. ROTH. Isn't that something.

Mr. GAGE. So this is something new.

Mr. ROTH. Right there, that is what Mr. Rohrabacher was talking about.

Mr. GAGE. The great debates, technology in the future. There is Matt. Matt is talking about privacy—oh, he is in sixth grade, he has written about privacy and technology. Let's see his advice. Should people be able to wiretap a home without legal consent. Is this apropos?

Mr. ROHRABACHER. How old is this kid?

Mr. GAGE. Well, sixth grade.

Mrs. MEYERS. He says wiretaps are good.

Mr. GAGE. Instead, they increase privacy.

Now, when this kid gets a sound blaster card and he is suddenly totally encrypted, we will see what his opinions are about this. We could send him e-mail.

He has what you only barely have now in the Congress. He has an e-mail mail account on the Network. Let's go back.

He says they save time so the government doesn't have to pay detectives for as long because the evidence is the voice of the criminals plotting the crime. This is real-time civics. And look, he wrote all of this.

Mr. ROHRABACHER. This is a sixth grader.

Mr. GAGE. So what does Christine think? Well, let's find out. Christine wrote an article. Invading privacy is a serious topic which needs to be discussed. Should anybody be able to wiretap or bug somebody's phone? Yes. It is an excellent way to get rid of criminals.

Wisconsin wants everyone to wiretap. So we could have a political discussion here. I was going to show you—although we are running out of time—the other enormously interesting part of this. I will see if I can find it for you.

The Department of Transportation places sensors, in the streets of the United States so when you stop at a stoplight and it changes the signal, all of that goes to a computer someplace. Thus, we can wander cities in the United States, we can go to San Diego and see the traffic in San Diego thirty seconds ago.

Mrs. MEYERS. If my city has that, can we go there?

Mr. GAGE. Let's go see if we can find it. Now you can touch a buoy in the Long Beach Harbor off Hawaii and it will tell you the water temperature at that instant.

Mr. ROHRABACHER. What we need to do is find the traffic of the San Diego Freeway in Orange County.

She wants to find it in her——

Mrs. MEYERS. No, that is all right. Go ahead.

Mr. GAGE. All right. Let's see. San Diego.

Mr. ROHRABACHER. San Diego Freeway in Orange County.

Mr. GAGE. All right. If I go here first, then San Diego time, traffic report, this one will take us to Orange County.

Mr. ROHRABACHER. It will?

Mr. GAGE. Yes. Because San Diego's spillover is Orange County's traffic.

Mr. ROHRABACHER. Oh, all right.

Mr. GAGE. So we can go to a map of San Diego—here is the Orange County traffic report. Shall we try that? There are intersection photos you could see. So this—and interesting privacy questions begin to come up.

If you have a little television, a little camera, you can take a picture and publish it on the Net. So we are seeing pictures, we can go to Stockholm or Singapore, we can look at a camera that is looking out the window, we can go to Cambridge.

Mr. ROTH. You could really defame someone, though, by doing that. If I don't like one of the Congressmen, I can go on Internet and put him on with all kinds of false information.

Mr. GAGE. You certainly could. You could pick that phone up and call every citizen and say the same things on the phone line. They are exactly right, they will know who did it, it is coming from your computer.

Mr. ROTH. I have to find a different computer the day before the election.

Mrs. MEYERS. You won't do that to me, will you?

Mr. GAGE. Maybe I am wrong. Maybe it is not your children we have to worry about it. Maybe it's you.

All right. Let's try a map of Orange County.

Here comes a map. That is Orange County, and it will fill in bit by bit, and you can see the legend here, 20 miles an hour and below, 20 to 35, 35 and above, suspected incident. We are going to

see a lot of those—and each of these little dots is a sensor that sits on the freeway and counts the cars that go by. So pick someplace. Long Beach. Huntington Beach. Oh, my gosh. I may miss it.

Mrs. MEYERS. Look at all those incidents. Those blue dots, those are incidents.

Mr. GAGE. Those are the drive-by shootings that Huntington Beach is famous for. Let me go to San Diego because the dots are bigger and I can actually touch them.

Mr. ROTH. With this you could probably find out where people are picked up for speeding and then you would know where not to speed.

Mr. GAGE. Well, one of the challenges for you—you will notice when you go to one of these sensors—is that their measure how fast the traffic is. Americans are like this. There is a speed limit, it says 55, and you see the real truth, 84. Let's go to the current San Diego area freeway speeds.

Time and date, the 13th of June, Tuesday, here is southbound 805 at 8:21, that is 11:21. My, that is 3 minutes ago. So this is 3 minutes ago, this sensor sitting at southbound 805 at Mesa College Drive tells us the lane speeds; 74.4 miles an hour, 65.5, 74.3, 80.4. Fifty-five cars went by in the last 30 seconds. We paid for all of these sensors. Orlando, every city.

Mr. ROHRABACHER. This is in the middle of traffic time. I don't know how they could do that.

Mr. GAGE. All they did, they haven't done anything fancy, they just turned on the PC, or whatever computer, any file on any computer in the world can now be touched by another. So if I go back to my policy position, this changes what export means and it changes this idea—and the idea that there is such a thing as a supercomputer when every computer is linked by this around the world.

Mr. ROTH. This has been most illuminating, John. It is fantastic. We thank you for doing this.

This is going to shed a whole new light, a whole new dimension on what we have to do here on Capitol Hill.

Thank you, John. It took a lot of work to set this up and we want you to know we appreciate it.

Thank you.

That will conclude our hearing today. Thank you.

[Whereupon, at 11:25 a.m., the subcommittee was adjourned.]

APPENDIX

PREPARED STATEMENT OF HON. DONALD A. MANZULLO, SUBCOMMITTEE ON INTERNATIONAL ECONOMIC POLICY AND TRADE

Mr. Chairman, thank you for holding this hearing today. It is imperative that Members of Congress realize that the technology revolution is totally reshaping our world that bureaucrats cannot control.

We all applauded when President Clinton lifted export controls for most countries on computers below the 1,000 MTOP level, up from 12.5 MTOPS. That was a welcome change. But that occurred 16 months ago, which is reaching the end of a product life cycle of one generation of computer technology.

The time has come for a total reconsideration of our export control policy. With 150 billion computer chips being made all over the world every year and in an era of instant international communication over the Internet, it's time to focus a new post-cold war export control system on what truly contributes significantly to the production of weapons of mass destruction. We cannot afford to waste time controlling the uncontrollable.

The chain is only as strong as its weakest link, and that's why I strongly support your effort, Mr. Chairman, to emphasize multilateral efforts that focuses like a laser beam on items that truly deserves strict control. Otherwise, we're just shooting ourselves in the foot when we surrender markets to our economic competitors.

I look forward to the testimony of the witnesses here before us. I wish only the entire House of Representatives could see these demonstrations. Thank you, Mr. Chairman.

C. MICHAEL ARMSTRONG
CHAIRMAN AND CEO
HUGHES ELECTRONICS
WASHINGTON, D.C.
9:30 A.M., JUNE 13, 1995

Mr. Chairman, Members of the Committee: As you know, it is my distinct honor to serve as Chair of the PEC — the President's Export Council — but today, I appear as Chairman and CEO of Hughes Electronics. As such, I speak for myself and my company only. But the issues under your purview are critical not simply to my company, but to so many of America's cutting edge industries — and, indeed, to the competitiveness of the U.S. economy as a whole.

I would like to begin today with what I believe is a fundamental factor of the Information Age: and that is the speed of technology in bringing new products, new capabilities, new markets, new lifestyles — a new economics to our society.

In contrast to the days when either government or mega-corporations defined markets, today the contest pits the speed of technology versus the speed of bureaucracy — or, more precisely, the lack of it — as the information age makes a mockery of borders and barriers of all kinds. While the government is busy managing technology exports, the 1995 Cadillac now has roughly the computing power under its hood as the original guidance systems that landed the Apollo space capsule on the moon.

We seem to think technology can be quarantined by bureaucracy. The fact is: Technology travels. One nation's export ban is another nation's economic boon: An invitation to win trade opportunities while competitor companies are kept in the penalty box. On this last point, let me offer as "Exhibit A," an outdated Munitions List that too often teaches the right lesson to the wrong people.

In April, it was a businessman stopped at Customs for attempting to carry a telephone with him on a foreign trip. The phone was equipped with a security scrambler — a technology that was on the Munitions List. That made the telephone a dangerous weapon — right along with ballistic missiles and nuclear warheads. Meanwhile, any foreign national can walk into an American computer store, buy the same encryption software that makes the phone secure — and take it out of the country. And even that is a waste of a plane ticket — because anyone on the Internet can e-mail the program, anywhere in the world. You can even print the computer code on a mailing label and send it abroad — for the price of a postage stamp.

In fact, there's only one way you can't carry or sell that software abroad — and that's if you're an American citizen.

And what's true for telephones is true for transponders as well: What we can't sell abroad, foreign nationals can freely buy in markets around the world. Mr. Chairman, we see it in industries from automobiles and aircraft engines to

pharmaceuticals and computer chips: "commodity jurisdiction" snafus don't just defy common sense — they cost the U.S. jobs and GDP.

My company has worked hard to be a world leader in the development and manufacture of tactical missiles that range from the Tomahawk and TOW to the Stinger, Maverick and AMRAAM. We at Hughes know something about armaments. We're also the world leader in the development and manufacture of commercial communications satellites. And we know the difference between a satellite and a weapons system. Whether it's the NBA Finals or Seinfeld or CNN: Communications satellites pose no danger to national security — and they may just advance the flow of communications into the closed societies of the world.

To protect our national economic interest, as well as our national security, we must bring the Munitions List out of the Cold War: We must have a pro-export policy that enables an internationally competitive America — a policy that, by definition, includes a revamped, revised Export Administration Act.

The same concerns account for my opposition to unilateral economic sanctions that simply penalize American business and workers. Generally speaking, history has judged unilateral economic sanctions as an unsuccessful policy to change errant behavior. Let me cite a recent example.

In August of 1993, the State Department invoked unilateral economic sanctions against China for violations of the Missile Technology Control Regime

(MTCR). This was due to alleged shipments in 1992 by China of M-11 missile parts to Pakistan. The State Department chose to extend interpretation of the Munitions List to embedded technology. Based on this interpretation, it then forbade the export or launch of commercial communications satellites. As a result:

Australia and Hong Kong could not launch their Hughes satellites — satellites that would primarily be carrying home TV, much of it American programming. As a direct result, China canceled orders with Hughes for 2 satellites, mainly to be used for tying their banking system together. This was a $400 million order worth hundreds of American jobs. Then, after Chancellor Kohl visited China and pointed out the differences between American and German policy, China canceled a joint agreement to build 10 satellites — and transferred this multi-billion dollar agreement to Deutsche Aerospace. Thousands more American jobs were lost.

These sanctions did not economically hurt China — but they certainly registered in California, affecting employment for people already dealing with difficult times.

We need to recognize the economic reality that the U.S. is no longer sole supplier of the world's state-of-the-art technology. It's a tough market out there and for other countries, U.S. unilateral economic sanctions are the greatest competitive advantage our competitors enjoy. If we are going to impose

economic sanctions, they should penalize the errant country and be our calling card — our challenge to our allies to join us. Sanctions must be multi-lateral: Anything less is simply a shift in the flow of commerce, a few thousand fewer jobs in America — and no change in behavior. The purpose of sanctions must be to change errant behavior, not to downsize American business and jobs. The purpose must be to punish the perpetrator, not the victim, as was unfortunately done to Hughes with the China MTCR sanctions.

In the area of sanctions, I would like to restate a recommendation I recently made to Mr. Christopher, Secretary of State: There needs to be a new process- a process with input from affected industry before sanctions are announced. With such a process, it's possible sanctions could be implemented without sustaining such serious self-inflicted wounds. In my opinion, unless and until such a process is adopted - American companies, workers, and our competitiveness will be unnecessary casualties of a government more sensitive to politics than to its people.

But if the Information Age makes a mockery of borders and barriers, it is in this context that we should ask, "How much Government do we need?"

I believe the answer is simply, just enough.

Just enough government to sustain a globally competitive society.

While the premise of "just enough" is hard to dispute, the Devil is in the details. Thus, in our quest for exports: I would propose we answer the question

What must government do to enable America to be an export superpower?

First, government must act to open markets for our exports and our investment.

The passage of NAFTA and GATT will serve trade expansion well — and the passage of these landmark agreements was surely a signal from both ends of Pennsylvania Avenue that America's destiny is tied to trade.

However, we need to build on those successes, and open the markets of the second largest commercial nation in the world. We should all support the difficult negotiations now underway with Japan. It will never be easy; it will take understanding and trust on both sides; but it must be done now.

We need to sustain our support for Mexico, our third largest export market. It is not politics; it is not federal aid; it is not a give-away to banking interests; it is simply in our economic self-interest.

We need to ensure market access to U.S. consumer goods — taking aim at restrictive standard designed to keep our products out and protect domestic producers.

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We need effective, strategic negotiating authority in government to respond, act and conclude. Fast-track negotiating authority is not an option — it is a necessity — if we really want to open markets.

And while we drive to open markets, we should concurrently demand that respect for intellectual property rights must be a condition of access to our market.

Second, in addition to opening markets, all of our government must act as an export advocate. While the Department of Commerce has a sensible and thoughtful National Export Strategy, we need support and follow-through in the marketplace. The Departments of Commerce, Defense, Transportation, Energy and Ambassadors around the world are not only stating their support, but engaging to help make things happen. But we need even stronger advocacy; coordination and leadership in international markets, not just on domestic podiums.

I've heard proposals to reorganize the U.S. Foreign and Commercial Services — newly named the Commercial Service — a network of offices across the country and in our embassies whose clientele are American companies trying to break export barriers and win business. This is an area where our present policy makes sense — change would be a mistake. It ain't broke — so don't fix it.

And I've heard of proposals to turn export licensing over to the State Department, just as we should be realizing that export policy ought not be tied to foreign policy. As Clyde Prestowitz said recently, "If you really want to kill exports, put export licensing in the State Department."

Third, at times, government must act as an export financier. This is not a disguised form of foreign aid. There are many instances where businesses and banks with their balance sheets should fear to tread. Where the risk, the venture, or the competition dictates that the appropriate role of government is as guarantor.

EX-Im and OPIC are market necessities for large and small American businesses to compete abroad and create jobs at home.

Mr. Chairman, fundamentally, we need the right functions of government doing the right things for our global competitiveness. Anything less and our exports will decline and our economy will suffer.

But with the right kind of support we will realize America's economic destiny as an export superpower, which will mean more well-paid jobs for Americans and a sustainable high standard of living for America.

Thank you once again for inviting me to speak. I will be happy to answer any questions you might have.

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